REMARKS

In the Office Action mailed May 15, 2003, the Examiner objected to grammatical informalities in the specification and claims, rejected claims 1-6 and 14 under 35 U.S.C. §102(a) and rejected claim 13 under 35 U.S.C. § 103(a). The specification and claims have been amended to address the noted formalities, as well as other formal matters only. Applicants request reconsideration and allowance of claims 1 through 15 in light of the following arguments.

Claims 1-6 and 14 were rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 6,549,288, issued to Migdal et al. ("Migdal"). It is well settled that "anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference." *Scripps Clinic & Research Found. v. Genentech Inc.*, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Anticipation also "requires identity of invention: the claimed invention, as described in appropriately construed claims, must be the same as that of the reference, in order to anticipate." *Glaberbel Société Anonyme v. Northlake Marketing & Supply Inc.*, 33 U.S.P.Q.2d 1496, 1498 (Fed. Cir. 1995). Thus, to properly reject a claim for anticipation, "[t]here must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." 18 U.S.P.Q.2d at 1010.

According to the Examiner, Migdal discloses taking two images from different but complementary illumination angles, recording the intensity of only the diffusely reflected light, and using the difference in the recorded intensities to

obtain representations that emphasize variation in the gradients of the surface. (Office Action, p. 2-3). Applicants respectfully submit that this does not properly describe the method disclosed by Migdal. The key distinction between Migdal and the present invention is in the methodology to determine the surface topography. Migdal implements what is known as a triangulation method whose key feature is the use of a structured light pattern to generate the 3D map. Migdal discusses this methodology throughout the specification. (e.g., see Migdal, col. 3-4, lines 66-7; col. 8, lines 1-3; col. 9, lines 23-37). The methodology is based on the use of the structured light pattern to generate the 3D map. (Migdal, col. 4-5, lines 52-6). The structured light pattern is generated by masks 107 and 504 shown in Migdal's Fig. 1 and Fig. 5.

The present invention, on the other hand, is based on what is known as a photometric stereo or shape-from-shading methodology that utilizes non-structured light. In this method, the intensities of the diffuse reflections of images taken from different illumination angles can be used to generate the 3D map. There is no structured light source, no masks, and no strips superimposed on the image–only unstructured light to generate a surface topography.

While Migdal discloses the use of images taken from different illumination angles, the underlying purpose of using such images is vastly different for Migdal and the current invention. Migdal's basic technique requires two light sources that are not from different angles, but from the same angle (Migdal, Fig. 1, elements 104, 105). Migdal does disclose taking two additional images from a

different direction. (Migdal, Fig. 5, elements 501, 502). The additional images, however, are not used to generate the surface topography but instead are used as a statistical averaging feature and to determine material properties. (Migdal, col. 8, lines 31-35; col. 8, lines 36-42).

The presently claimed invention, on the other hand, requires the second image to be taken from a different, yet complementary angle to that of the first image. The intensity recorded from a topographical surface element is a function of the diffuse reflectance and the angle relative to the illumination. By taking images from different angles the diffusive reflectance dependence can be removed and the resulting differences are due to the topography of the surface. (Specification, p. 2, lines 13-17). Symmetry in the illumination angles is used because it leads to a fairly simple analytical expression for the gradient in the surface shape which may be integrated to obtain the height function of the test surface. (Specification, p. 4, lines 15-25). Thus, in the present invention, different but complementary illumination angles are instrumental in determining surface topography while Migdal uses different illumination angles for statistical averaging reasons and material property determination–not to generate surface topography.

Another difference in methodologies of Migdal compared to the claimed invention is the role of diffusely reflected light. The key to the triangulation method employed by Migdal is the use of a structured light pattern, not a diffusely reflected non-structured light pattern. (Migdal, col. 4-5, lines 52-6). The uniform illumination of Migdal is used in a normalization technique to enhance the quality of

the triangulation method and to determine material properties, not to determine topography. (Migdal, col. 4, lines 44-51). The claimed invention uses only diffusely reflected (nonstructured) light to determine topography. Using only the diffusely reflected light permits a representations for variations in the gradient of the surface shape. The surface topography can then be generated by appropriate integration. (Specification, p. 4, lines 15-25). For at least these reasons, Applicants submit that independent claim 1 of the present application is not anticipated by the disclosure of Migdal and claims 1-6 and 14 should be allowed.

Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Migdal in light of knowledge of one of ordinary skill in the art that 3D profiling may be used to obtain the profile of paper. Applicants submit that claim 13 is allowable for at least the same reasons as claim 1 from which it depends.

CONCLUSION

If there is any additional matter that may be resolved by telephone or fax, the Examiner is invited to contact the undersigned to expedite issuance of this application.

Applicants do not believe that any fees are due in connection with this response. However, if such petition is due or any fees are necessary, the

commissioner may consider this to be a request for such and charge any necessary fees to deposit account 23-3000.

Respectfully submitted,

WOOD, HERRON & EVANS, L.L.P.

By: _____
Kevin G. Rooney
Reg. No. 36,330

2700 Carew Tower
441 Vine Street
Cincinnati, OH 45202
(513) 241-2324 (voice)
(513) 421-7269 (facsimile)

K:\STOCK\02\Response.wpd